Module Name: Software for Networked Systems

Acronym: SNS

Module Manager: Dr Miguel Rio

Course Summary:

This Module provides an introduction to computer programming and to network programming specific paradigms. The source assumes no knowledge of programming skills and it starts with an introduction to the Java programming language with a strong emphasis on Object Orientation. Network programming is then covered in detail, namely socket programming for TCP, UDP and Multicast. The course includes an introduction to the Android Development process with an emphasis in a network API. The course finishes with an introduction to Software Engineering and the relationship between software design and programming. Assessment is through the programming of an Android application.

Intended Learning Outcomes

On completion of this course, students should be able to:

- Program simple programs in Java using Object Orientation
- Program a client/server application using Java sockets that use TCP, UDP and Multicast.
- Design and implement network applications for mobile devices using the Android Development Kit
- To understand the fundamentals of Software Engineering design

Course Content

- **Introduction to Programming**
  - Introduction to Java programming
  - Object Orientation
  - The Java Class Library
  - The Socket Programming Interface
  - TCP, UDP and Multicast sockets
  - Multi-threaded servers

- **The Android Mobile Operating System**
  - Introduction to the IP protocol (IPv4 and IPv6)
  - Intra-domain routing
  - Inter-domain routing
• **Software Engineering**
  o Introduction to Software Engineering
  o The Unified Modelling Language
  o The Agile Software Development Approach

• **Lab**
  o The course contains several lab sessions where a set of lab sheets illustrates the concepts taught in Lectures.
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**Assessment:**
Assessment is an Android application with a report. The application is done in a group with individual parts and evaluated individually.

**Tutorials/Workshops:**
A two hour tutorial will follow a week after the completion of the module.